Memorandum

To: Accuracy Working Group List (see attached list)

From: Mike Paglione, *FAA ACT-250;*
           Lori Charles*, Signal Corporation*

Date: 2/4/2002

Re: **Analysis of User Request Evaluation Tool Daily Use System Aircraft to Airspace**

           Predictions for ZTL Risk Reduction Runs

Scope

As part of the Risk Reduction Task, the ACT-250 Conflict Probe Assessment Team (CPAT) has developed a set of software tools to directly measure the missed and false alert rates of the User Request Evaluation Tool Daily Use (URET DU) aircraft to airspace conflict predictions. This is analogous to what MITRE CAASD developed to measure the aircraft to aircraft conflict predictions for the specification refresh. The tools will provide accuracy information for the various Risk Reductions Scenarios planned for late FY01 and FY02.

This study includes two current plan accuracy runs for the ZTL Risk Reduction scenarios. The study will support the informal accuracy analysis of the URET CCLD system in ZTL, namely the aircraft to airspace conflict prediction requirements CIA1061 through CIA1066.

Results

Table 1 provides the counts of the various alert records, conflicts, and missed alert probability for each scenario for the current plans. The airspace conflicts are currently defined as penetrations of the buffered boundaries of the locally adapted special use airspaces from the aircraft post-processed track positions. Vertically a distance of 500 feet below flight level 290 and 1000 feet above is included as part of the buffered boundaries of the special use airspaces. Horizontally the buffered boundaries of the special use airspaces are defined by URET DU adaptation.

As defined by the URET CCLD specification, the probability of false alerts is a function of the number of false alerts divided by the number of non-conflict encounters within certain ranges of minimum horizontal separations. These non-conflict encounters have separations up to 30 nautical miles from the buffered boundaries of the special use airspace (SUA) horizontally and 4000 feet below flight level 290 and 5000 feet above vertically. For false alerts with encounters beyond these thresholds both horizontally and vertically, the counts fall into the largest false alert bin. For retracted false alerts, which match a particular conflict, the minimum horizontal separation is

assumed zero, so these cases are tallied in the smallest bin. Tables 2a-b contain the encounter counts, false alert counts and false alert probabilities per requirement bin for each scenario.

An additional outcome of the study was the twelve specific reasons for the various aircraft to airspace accounting of the missed, false, valid, and discarded conflict predictions. Table 3 describes the various reasons and lists the counts for each scenario. For example, the Table 3 row labeled NO_CALL_MA is an aircraft to airspace conflict that was not notified at all by URET DU and contributed to 6 of the 7 total missed alerts for the ZTL 1733_2000 scenario current plan run. URET DU did present notifications for the remaining missed alerts but not within the required 5 minutes of the actual conflict start time. In this case, the 1 missed alert is found in the next row in Table 3, labeled LATE_MA.

Conclusion

This study provides a direct measure of the performance of URET DU aircraft to airspace conflict predictions for the two ZTL Risk Reduction scenarios. This was only performed for the current plan runs and only the SUAs locally adapted by URET DU for ZTL in the October 5, 2000 chart cycle are being applied in this study. All the SUAs remain active for the duration of the runs.

This study completes the analysis of aircraft to airspace conflict predictions for the single site ZTL Risk Reduction runs of URET DU.

Table 1: Current Plan Runs Alert and Conflict Record Counts

Description	SCENARI0 RR ZTL 1733_2000		RR ZTL 1914_2230	
Total Alert Records	1121		1801	
Total Notification Sets	257		367	
Total Number of MAs	7		10	
Total Number of FAs	25		24	
Total Number of VAs	38		62	
Total Number of Discards	193		286	
Total Number of Encounters (not conflicts)	865		1464	
Total Number of Conflicts (C)	45		81	
Missed Alert Probability = #MA/(#MA+#VA)	0.156		0.139	

Table 2a: RR ZTL Current Plan Runs 1733_2000 Study False Alert Probabilities

FA Bin	#Encounters	#FAs	Prob(FA)
0 >= X < 7	234	22	0.094
7 >= X < 9	35	0	0.000
9 >= X < 11	43	0	0.000
11 >= X < 16	105	1	0.010
16 >= X	448	2	0.004
Subtotals	865	25	

Table 2b: RR ZTL Current Plan Runs 1914_2230 Study False Alert Probabilities

FA Bin	#Encounters	#FAs	Prob(FA)
0 >= X < 7	364	18	0.049
7 >= X < 9	85	1	0.012
9 >= X < 11	61	2	0.033
11 >= X < 16	194	1	0.005
16 >= X	760	2	0.003
Subtotals	1464	24	

Table 3: RR ZTL Current Plan Runs Aircraft to Airspace Conflict Prediction Accuracy Counts

Code	RR ZTL 1733_2000		RR ZTL 1914_2230		Alert Type	Reason Description
STD_VA	22		41		VA	Standard valid alert
LATE_VA	16		21		VA	Late valid alert, valid since conflict was a popup
NO_CALL_MA	6		7		MA	No call missed alert
LATE_MA	1		3		MA	Late missed alert
NO_CALL_DISCARD	0		7		DISCARD	No call discarded since out of adherence
LATE_DISCARD	0		2		DISCARD	Late discard since out of adherence
NO_TRK_FA_DISCARD	181		248		DISCARD	No post processed track a predicted conflict start time so discard
NO_ADHER_FA_DISCARD	5		14		DISCARD	Out of adherence at predicted conflict start time so discard
CLR_FA_DISCARD	4		6		DISCARD	Retracted FA assigned by an ATC clearance so discard
CFL_FA_DISCARD	3		9		DISCARD	FA notified beyond last conflict actual start time so discard
STD_FA	17		11		FA	Standard false alert
RETRACT_FA	8		13		FA	Retracted false alert, notification end time < predicted conflict start time

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[1] Accuracy working group list includes all participants involved on URET CCLD accuracy measurement. Email sent to the ACT-250 email account, accuracy@tatca.tc.faa.gov, will be forwarded to everyone in the list.